

The price of skill in early modern Europe: an analysis of apprenticeship premiums, 1710-1750

Chris Minns and Patrick Wallis (Economic History, LSE)

FIRST DRAFT: please do not quote

Introduction

Human capital is central to recent theoretical and empirical analyses of long-run economic growth. Several recent accounts show pre-modern Europe (or particular regions within it) having unusually high levels of human capital formation. Van Zanden (2009), for instance, has drawn attention to the relatively low and stable skill premium in North-Eastern Europe, when compared to other parts of the continent and Asia. Apprenticeship was one of the main ways in which skills and human capital were generated in pre-modern economies. Epstein has argued that long run growth in Europe was in part rooted in human capital formation secured by guilds, contrary to their older representation as opponents of technological change. Humphries has pointed to corporate apprenticeship as one facilitator of England's precocious structural change from agricultural employment into secondary and tertiary sectors.

Underpinning the functioning of apprenticeship was a training market that matched (mostly male) youths with masters who had the capacity to provide training. For apprenticeship to operate effectively, arrangements must have provided both parties with an incentive to invest in a long-term relationship. On paper, the operation of the recruitment market was highly regulated. In England, apprenticeships were legally set at a minimum of seven years, and apprentices were unable to marry or command money wages during their time of service. Various bodies had the capacity to enforce regulations, and evidence exists to suggest that they were enforced at least some of the time. Much of the recent literature on pre-modern human capital formation (Humphries 2003; Epstein 1998) has sought to explain the durability of apprenticeship contracts. Various institutions have been identified as possessing the ability to secure what were necessarily under-specified contracts. Guilds in particular have been highlighted as possessing a socially beneficial contract enforcement role. Some authors have contended that apprenticeship regulation, as maintained by the guilds, served to exploit apprentices at the expense of their masters. Others argue that the enforcement of regulations was necessary to give masters an incentive to train in the first place.

It is increasingly clear, however, that these analyses are based on an inaccurate set of assumptions about apprenticeship contracts – assumptions that are largely derived from official regulations and formal institutions. The characteristics of premodern apprenticeship were quite

different in practice. Several common stylized facts need to be revised, at least for the English case. Chief among these is that apprentices and masters were not locked into well-enforced contracts. As we have shown elsewhere, a large proportion of apprentices left before their contracts were completed, often it seems after receiving several years of training (Minns and Wallis, 2009). Figure 1 shows the share of London apprentices indentured between 1685 and 1695 who were still in residence with their master (a good proxy for the persistence of the contract). The majority of apprentices were no longer found in their master's household in the second half of a seven year indenture period. It is also clear that apprentices were less reliant on social networks to access training than has often been assumed. The average London apprentice entered a contract with a master with whom they had no prior kin, geographical or occupational connection, with the typical match being between a master an apprentice who were both migrants to London from different provincial counties (Leunig, Minns and Wallis, 2008).

Apprenticeship flourished despite weak contracts and limited social capital within the labour relationship. Very large numbers of youths entered apprenticeships – over one in twenty male teenagers entered service in London alone in the later part of the seventeenth century – and large numbers of masters agreed to train them, despite the frequency of attrition. How did apprentices and masters negotiate contracts in such conditions of uncertainty?

An important part of many apprenticeships was a training premium paid to the master upon indenture. For apprentices, premiums made up a significant share of the direct, upfront cost of engaging in training. For masters, premiums could offer compensation for the quality of training they provide, for the position of their company or occupation (and the position of the master within the company or occupation), and for the perceived limitations of the apprentice being trained, both in terms of productive characteristics and the possibility of early unplanned departure. Unlike many other aspects of an apprenticeship agreement, premiums were recorded, and detailed evidence on early modern premiums in England have survived through the rolls of the Stamp Tax.

The literature has identified premiums as having several effects. Epstein (1998) and de Munck (2007) identify them as a way to raise the trainee's cost of default. Humphries (2003) sees them as part of the apprentices' contribution to the costs of their training. Ogilvie (1997; 2004) argues that high fees (no data exists on premiums paid in Wurttemberg) were a device to exclude outsiders and reduce competition. Ben-Amos (1994) and Brooks (1992) suggest they established barriers to entry that created and perpetuated social inequality – de Munck (2007) also suggests there was deepening

polarization apparent in fees. These studies have not offered, however, any systematic quantitative analysis of the premium size.

In this paper, we have drawn a preliminary sample of training premiums from seven London companies between 1710 and 1750. We use this sample to pursue two main avenues of investigation. First, how large, and how common were training premiums? Answering this question gives us a preliminary sense of the cost of acquiring skill in the early 18th century, and can be compared to the prospective returns from training. Second, to what extent do the characteristics of masters, apprentices, and their companies account for the premium patterns we observe? Did premiums vary with characteristics associated with the likely relative productivity of masters and their apprentices? Were masters able to use premiums to capture economic rents from training arrangements?

Premiums and apprenticeship

The basic economics of apprenticeship form a well established part of standard human capital theory. Over the duration of the contract, masters supply training and other benefits in exchange for labour and fees to an equivalent value from their apprentices. In a similar manner, potential apprentices compare the benefits and costs of engaging with a master. The benefits consist of skill acquisition, which could arise through direct instruction and observation of the master in the workshop, and access to the commercial and professional network of their master. The costs for apprentices include opportunity costs, in the form of foregone earnings while apprenticed, and direct costs which would include premiums paid to the master at the outset of training.

As with modern training, our understanding of the economics pre-modern apprenticeship is complicated by the lack of detailed information about the distribution of costs and benefits between contracting parties. In many cases, these were unlikely to have been fully specified in the original indenture contract. The amount of productive labour a master could anticipate from each apprentice depended on a range of factors, including some which might be readily observed on entrance – such as time at school or abroad, and some which might not be – such as aptitude, commitment and the probability of early departure. Working hours and conditions might vary substantially between contracts, as would masters' investment of time and effort in training. The costs involved in taking an apprentice also varied. The accommodation, food, and clothing they were to receive were frequently subject to detailed agreements between parents and masters, which we can only normally recover in subsequent disputes. Although wages were technically illegal in London, apprentices could also received

payments and perquisites from their masters during and at the end of their terms.¹ Apprentices also faced a set of parallel concerns about the terms and operation of their contracts.

From the perspective of training masters, a major potential benefit from training is the surplus received from trained apprentices, which arises due to the difference between apprentice productivity and the compensation offered in the form of room, board, and possible perquisites. Given that so many apprentices did not remain with their masters for more than a few years (Figure 1), the scope for productive apprentice labour to provide a substantial payoff to many masters is questionable. As a result, the receipt of premiums may have been important in ensuring the willingness of masters to train. Premiums provide the only substantial aspect of apprenticeship arrangements that was explicitly recorded in the majority of surviving records. As such, they represent an element of the cost/benefit calculations for which we can generate direct evidence. They are, as should be clear, only one element of a contract that could be much more complex. This needs to be recognised when considering the results below. All these elements – including premiums – were changing over this period so no easy assumptions can be made about the relation of premiums to other unrecorded elements of the contract. The apprentice records we have collected, however, will allow us both to document the magnitude and frequency of premiums, and to explore how they were related to those personal characteristics of apprentices and masters that are likely to influence the price and return on training.

Some uncertainties surround the history of apprenticeship premiums. Premiums appear to have been relatively common in Paris and Antwerp, where contracts recording them survive.² However, the frequency with which English apprentices supplemented their labour with premiums, and their size is the subject of some disagreement in the literature.

The literature on apprenticeship suggests that premiums were widespread, and were large enough to represent a significant financial barrier to skill acquisition.³ For apprentice merchants, they might be large sums, rising from around £200 to £300 in the first half of the century to £1,000 by 1700.⁴ For apprentices in the trades, fees of £20 to £30 have presented as common (Brooks 1992). At the close of the century, premiums were widespread and large enough to be considered worth taxing. From 1709,

¹ These are prominent in Montreal contracts analysed by Hamilton (1995). No premiums were paid in her sample.

² De Munck, (2007), pp. 42-9; Kaplan, (1993).

³ Grassby, (1995) pp. 67-69; Dunlop and Denham (1912) p. 200; Lane (1996) p. 19; Brooks (1994) p. 70; Ben-Amos (1994), pp. 90-91.

⁴ Grassby, (1995) pp. 67-9.

Stamp Duty was payable on premiums. Premiums below £50 were taxed at 2.5%. Those above £50 paid 5%.⁵

One consequence of the tax was the creation of a set of registers recording premiums across England from 1709 to 1811. These are sufficiently large – containing the details of over 250,000 apprentices in the first half century alone - and problematic that they have never been analysed systematically.⁶ Here we use a different source on premiums that has only rarely been utilised: premiums recorded in London guild registers.

London was by far England's largest city, with a population of over 500,000 in 1700, and it was the centre of manufacturing and trade. London guilds maintained extensive registers of apprentices as part of their attempt to regulate their members and their trades. After the introduction of the stamp tax, a number of guilds began to record premiums alongside the standard information about apprentices (their name, place of origin, and father's occupation or status) and masters that they had gathered for centuries. These guild records have several advantages as a source on premiums. Most importantly, unlike the stamp tax registers, guilds often recorded when no premium was paid. Masters also had no incentive to under-report premiums to guilds, as their registration systems were entirely independent from the tax collection. Guild registration was also better established than the stamp duty, included local monitoring systems, and presented lower incentives to evasion compared to the tax collectors.

Guild registration and regulation of apprenticeship did, of course, face its own challenges. London's guilds were weakening in the eighteenth century as the city sprawled and exclusive institutions found limited external support. As membership of guilds became less necessary to an urban career, the number of youths entering corporate apprenticeships stagnated, despite the continuing growth of the city. However, recent research has argued that London guilds retained a measure of vitality into the mid-eighteenth century.⁷ This fits with evidence on the numbers of entrants into apprenticeships, which declines sharply after 1775. More importantly, there is little reason to suggest that these institutional changes render the premium data problematic. If anything, it suggests that premiums will more closely relate to returns to human capital, rather than the expectation of rents from corporate barriers to entry.

We have assembled a preliminary sample of almost 5000 apprentice premiums over seven companies between 1710 and 1750. The source used provides information about the apprentice, as

⁵ 8 Anne, c. 9

⁶ TNA, IR1/1-72.

⁷ Berlin (2008).

well as the size of any premium paid. We are also able to attach additional information about apprentices and their masters for a subset of the full (preliminary) sample. First, we have also reconstructed evidence on the training careers of masters (their origins, and the number of apprentices they took). Over 1000 master records have been linked to the apprentices in the premium data. This allows us to link the presence of premiums and premium size to master characteristics that are potentially relevant for the training contract. Work with London guild records raises a familiar problem that the notional trade of the guild was not practiced by all the members: thus, members of the Fishmongers company might not be fishmongers. The level of heterogeneity varied between companies. To address this, we have also gathered supplementary data on the actual occupations pursued by masters and apprentices in our sample.⁸ At the time of writing, we we have put together a sample with occupations for about 500 apprentices in 3 companies. An additional piece of information we observe for about 3000 apprentices in four companies is whether or not the apprentice received the freedom following their term. For the majority of apprentices, the freedom was the first step on the path to becoming established in the company, and as such is a potential indicator of successful apprenticeship. We are able to explore whether or not larger premiums were positively associated with freedom. Finally, we use additional data from London court records on the proportion of premiums returned from dissolved training contracts to consider whether or not premiums served as a bond to raise the cost of default.

What determined premiums?

Economic theory suggests that premium size and premium frequency should relate to the characteristics of apprentices, their masters, and the guild or company in which the apprentice was engaged. The existing literature, written almost entirely by historians, contains suggestions that are broadly in line with economic ideas, but these have not been subject to a rigorous empirical evaluation of the type we propose here.

The explanation, as espoused by Epstein (1998) and others, is that premiums served as a bond, giving apprentices considerable disincentive to leave their master before the end of the indenture period. Whether this was indeed the case will depend on the size and frequency of premiums, and whether or not the master retained the fee if an apprenticeship was terminated early.

⁸ Anon, *A list of the liverymen of several companies of the city of London* (1750)

A simple supply and demand framework would predict that premiums should vary positively with the expected earnings in the occupation being trained. Earle (1992) and others suggest that income and potential wealth accumulation varied widely among craft and mercantile occupations in pre-modern London, and we would expect this to be reflected in the price that apprentices were willing to pay to enter into training. Scholars of early modern Europe have also argued that occupational prestige mattered alongside pecuniary incentives. Kaplan (1993, p. 449) suggests that Parisian premiums varied according to the prestige of a craft. De Munck (2007, p. 42) agrees in general, but finds very considerable variation within trades in the contracts he studies (which may not be terribly representative). Brooks (1994) makes a similar claim for England, based on the stamp duty registers.

The expected productivity of potential apprentices has been seen as an important determinant of premiums. Reith (2007, p. 183) suggests that fees were only charged for weaker youths among Augsburg bakers. More generally, we would expect masters to demand smaller premiums to take on youths for whom they would have more information prior to engagement. Masters would be able to collect more pre-indenture information about youths who had fathers in the same trade, or were of local origin, with lower premiums a consequence.

Characteristics of the apprentice's family may also have contributed to shaping apprentice premiums. Whether through nurture or nature, sons of fathers with relevant occupations may have been seen as more likely to be successful apprentices, which would lead to lower premiums. On the other hand, high status fathers may have been able to finance a placement with high end masters in the most profitable companies and occupations. An alternative possibility is that masters were able to price discriminate among apprentices, charging larger fees for the sons of wealthy father for similar training arrangements.

Premiums should also reflect the cost of training and maintaining apprentices. De Munck claims that some skills were most costly to teach, but produces little evidence to this effect. Reith suggests that premiums reflected whether clothing, bed and board were supplied. In England, clothing is often discussed as part of the contract, bed and board almost never. In premium disputes recorded in the Mayor's Court, most parents supplied clothing on entry (as part of the premium), but not thereafter. Wealthy families may have paid larger premiums in order to provide a more comfortable existence for their apprentice children. Daniel Defoe (1752, p. 12, 148) thought as much when he wrote that rising premiums in the early eighteenth century were due to 'unreasonable fondness and partiality' for their children leading them to seek to save them from menial offices.

Much evidence suggests that premiums size and length of indenture are related. De Munck (2007, p. 42), Greissing, and Reith (2007, p. 183) all find that premiums are lower in longer apprenticeships in continental Europe. If longer contracts allowing masters more time to extract surplus from trained apprentices we would expect this trade-off to be present. It is unclear, however, whether this should hold in the English environment; departure was common, and there is likely to be only a weak relationship between contract length and actual duration of residence with the master, while the minimum legal contract was, at seven years, already very long by continental standards. Unfortunately, we have not been able to explore this dimension in the current version of the paper.

Finally, characteristics of the master are expected to be related to premiums. Master who provided higher quality training that led to greater opportunities once freed ought to be able to command higher fees. Following this logic, masters who had more experience, better connections, or a better record of successfully training apprentices to freedom would receive larger premiums. Indeed, premiums might also rise over the course of a master's career, depending on his record with previous apprentices. We might also look for a relationship between the size of the master's enterprise, the number of apprentices trained, and average premiums. It may have been wealthy, well-connected masters who could afford to take on numerous apprentices; on the other hand, masters with multiple apprentices were likely to have devoted less attention to each trainee.

Apprenticeship Premiums, 1710-1750

Table 1 shows the premium data we have assembled so far. We list average premiums, information about their distribution, and the share of apprentices who paid a premium to their master. The data are tabulated separately for each of the seven companies from which we have recovered information.

Premiums varied by trade. Masters in high status and high income trades charged higher premiums than those in occupations where earnings were lower. As table 1 shows, all stationers, and the vast majority (84 percent) of apothecaries apprentices paid for training. The table also confirms that premiums were often large for youths seeking to become apothecaries, skilled medical professionals, and some grocers, who might run substantial wholesaling and distribution businesses. For youths entering more widely practised and less prosperous manual trades, premiums were lower and were demanded less frequently. Less than a third of blacksmith, plasterer, and vintners apprentices

paid a premium, and even the relatively large premiums in these trades well below median premiums in the apothecaries or grocers.

Roughly speaking, the frequency of premium payment is correlated with the economic opportunities available to those who were successfully able to complete training. This is greater evidence in Table 2, where we tabulate similar figures by occupation for apprentices in three companies (grocers, plasterers, and stationers), where we know occupation for a large subset of the apprentice sample. Here we are able to make comparisons between occupational premiums and estimates of late 18th century insured wealth by occupation from Schwartz (1992). As one would expect, there is less variation in median insured wealth than in training premiums, but the one low premium occupation we do have (printers) also had relatively little wealth insured.

Did premiums act as bonds to increase the cost of default?

Before entering into the analysis of premium size, we first wish to consider one of the classic explanations for the presence of premiums. As we noted earlier, very large numbers of apprentices failed to complete their training. It has been suggested that premiums provided an additional constraint on early departure by apprentices.⁹ Upfront payments such as premiums will impose a cost on early departure if they are not returned. There are, however, several problems with this explanation. First, as we show above, many apprentices did not pay premiums. Second, premiums were small sums relative to the capital required to establish a business in the sector. Earle (1989) provides a range of start-up costs, ranging from 50 to 200 pounds for Apothecaries, to 500 to 3000 pounds for Grocers. Families who were prepared to provide capital of this order may not have seen the loss of a premium as a serious impediment to the breaking an indenture contract. Further evidence comes from the fact that premiums were not always forfeit when apprentices left. Company records do not give any information about what happened when contracts broke down, but court records from London between the 1660s-1700s suggest that there was a normal expectation that a proportion of the premium would be returned dependent on the length of the term that had been served (see figure 2).¹⁰

In these disputes, most often (n = 119) no fault was indicated on either side and the contract was cancelled through one of several convenient technicalities (failing to enrol the indenture being the

⁹ Epstein (1998); de Munck (2007), p. 45.

¹⁰ Lord Mayor's Court, 'Decrees and orders, 1668-1707', London metropolitan archive, CLA/024/08/072-100. Ben-Amos (1994) suggests that the proportion returned depended on the length of time it took to learn the craft, but this is based on very small sample of Bristol cases: see pp. 121-23.

most common). Faults are indicated in just under half of the cases, and we might assume they were discussed but not recorded in at least some others. The fault cases are roughly split between faults by apprentices (n = 50) and masters (n = 64). Faults did affect the outcome. Where apprentices' misbehaved they were less likely to receive a share of the premium back (often embezzlements were involved), and vice versa. However, even when faults were involved, a proportion of the premium was still generally returned.

We should be cautious interpreting this data. It took resources to take disputes over premiums to court, and court cases tended to be pursued only when cases involved substantial sums; moreover, few court cases reached final judgement. These are, therefore, unusually well-resourced and probably unusually well-connected apprentices and masters. However, while we should be careful about generalising from such a sample, there seems little good reason to assume that the court's practice diverged wildly from the outcomes of negotiated or agreed settlements. And some of the cases emerged from masters reneging on earlier private agreements to pass on some share of a premium when turning an apprentice over to a new master.

Of course, the very existence of these cases underlines the fact that recovering a premium on departure might be costly and time-consuming. This must surely have reduced the flexibility of the training market to some degree, even if the normal expectation was that a proportion would be returned. Nonetheless, the evidence in Figure 2 is hard to square with premiums being used to prevent apprentice default. The link between time of service and share returned is consistent with masters redeeming residual premiums that were earmarked for consumption over the apprentice's term of service.

Explaining Premiums

Table 3 presents a first set of regression results explaining the presence and size of premiums. An important empirical issue here is the censored nature of the premium data. Various econometric solutions have been proposed to deal with this type of censoring. The first column of Table 3 lists results from a linear probability regression explaining the presence of a premium.¹¹ The second column is an OLS regression explaining the size of (log) premiums. We resolve the "zero premium problem" by

¹¹ We have also estimated this using probit techniques; the resulting marginal effects are extremely close to what is reported in Table 3.

creating a dependant variable equal to $\ln(\text{premium} + £1)$. The third column is output from a Tobit regression that formally accounts for the presence of censoring in the premium data.¹²

The explanatory variables used in Table 3 relate to apprentice characteristics drawn from the guild and tax records that report premiums. Apprentice origins were recorded, and the first two explanatory variables are indicators for county of origin – local apprentices are from London and Middlesex, neighbouring county apprentices from one of the six counties bordering the metropolitan area.¹³ Apprentices proximate to London were no less likely to pay a premium, but their premiums were significantly smaller, especially for Londoners. This pattern is consistent with masters demanding compensation in exchange for training youths for whom they would have difficulty in acquiring information prior to engagement. We will see, however, that this result is fragile when we look at different subsamples of the data.

The next three variables summarize three important characteristics of about the apprentice's family. Premium records tell us whether the apprentice was the son of a citizen of London, whether they were apprenticed to kin (usually their father), and whether the father of the apprentice was alive. Sons of London citizens were less likely to pay premiums for training, and those that did pay were pay considerably less. This pattern is consistent with a story of differences in information affecting the price of training. The sons of citizens were from families who were part of London's corporate community, and their suitability could more easily be judged through direct observation of the individual and family. Masters may also have been willing to waive premiums for the sons of colleagues as part of a broader economic exchange. Whether or not the apprentice's father was alive seems to have had no bearing on price, but those apprenticed to kin were much less likely to pay a fee. This is hardly surprising, given that most kin training relationships directly identified in the data were between fathers and sons.

The final variables are dummy indicators for occupation. These are constructed from information about the occupation of the father of each apprentice, and indicate to what extent premiums varied with the economic background of the apprentice's family. Several of these coefficients are significant; in particular, the sons of gentlemen, professionals, and fathers in distribution and sales paid much larger premiums. This may indicate that apprentices from wealthier families used their capital to match sons with prominent and successful masters, who demanded larger fees but provided greater opportunities to apprentices after completing the indenture period. Alternatively, masters may

¹² Censored quantile regression (see Conley and Galenson, 1994) is an alternative approach that we will explore further in future work.

¹³ These counties are Berkshire, Buckinghamshire, Essex, Hertfordshire, Kent, and Surrey.

have been able to take advantage of the substantial search costs involved in finding an apprenticeship to engage in price discrimination, charging greater fees for similar training for the sons of wealthier families. A third possibility is that wealthy families supplied their sons with larger premiums to allow for greater consumption during apprenticeship. We will return to these three possibilities in the subsequent analysis.

Table 4 replicates the regression from column 2 of Table 4 for each company in our sample.¹⁴ Several of the aggregate findings hold within companies. Company regressions do confirm that the sons of the wealthy paid larger premiums within all companies. The coefficients for gentlemen and professional sons are large in all seven regression, and significant in 5 or 6 of the seven companies. The parental background/premium relationship found in Table 3 does not appear to be driven by the selection of apprentices with certain parental background into particular companies. We may wish to temper claims regarding proximity and premiums until we have collected more premium data. Local apprentices and neighbouring county apprentices receive a significant discount on their premium within only two companies. Local apprentices have lower premiums in all other companies, but not significantly so.

The results in Tables 3 and 4 speak to the correlations between premiums and the characteristics of the apprentice trained. We were able to attach the characteristics of about 1000 masters to the records containing apprentice and premium information. This was done by matching master name to the complete sample of the London Livery Company records (see Leunig, Minns, and Wallis 2008), which contains apprentice information for a wider set of companies and much larger time interval than this paper.

This matching enables us to do two things. First, we can reconstruct the training careers of masters who we are able to identify in the Livery Company records; when did the master complete their apprenticeship, when did they take their first apprentice, and how many did they train over the course of their career. We know that the propensity to take apprentices is not evenly distributed among masters. Most took no apprentices, or at most one. A few masters took many. The premiums these masters received from their apprentices should allow us to distinguish between the different concerns that might motivate training. If premiums were lower among large-recruiters then this appears to fit with masters seeking to recruit labour. If premiums were higher and rising over the career of large-

¹⁴ In the current version of the paper, we present OLS estimates here. We will estimate Tobit models when we have larger company samples.

recruiters then this fits with the suggestion that masters were profiting from selling their experience and skills.

Second, we can recover similar information about the social and geographical origins of the masters to that which we have for their apprentices. This will let us ask whether premiums were affected if master and apprentice came from the same place or county, which could plausibly lead to a discount if the master knew the family of the boy entering training.

Column 2 of Table 5 presents the results of regression analysis when master characteristics are included. Column 1 is included to show regression coefficients for the baseline model estimated in Table 3 on the same subsample. Apprentice origins do not appear to have a significant relationship with premiums in the matched subsample (though the magnitude and direction are reasonable), but the effects of citizenship, kin, and father occupation are consistent with what we found before. Turning to the new variables in this specification (column 2), the coefficients on masters coming from the same place or county as the apprentice are negative, but neither is statistically significant. Similarly, none of the indicators for the number of apprentices taken over the career are statistically significant, though the marginal effect of being with a master having trained over 20 apprentices is large. We are conscious that the small sample size in this regression may be leading to imprecise results, and expect to be able to draw firmer conclusions once we have completed the digitisation of premium records later this summer.

For three of the companies for which we have evidence on premiums, we also have information on the occupation of the master and apprentice. Columns (3) and (4) of Table 5 report results of premium regressions for this subsample. The occupation variables are highly significant, and have a large effect on overall model fit relative to a baseline specification (compare column 4 and column 3). It is also worth noting that the statistical importance of parental occupation is reduced substantially once occupation is accounted for – the coefficient on gentleman father falls 40 log points, those for professional fathers and fathers in distribution and sales fall further and are no longer statistically significant in column 4. This estimate is based on a small sample, and we cannot say at this point if this pattern extends across a wider spectrum of companies, but the findings here indicate that some of the larger premiums paid by sons of gentlemen, professionals, and those in sales and distribution reflect prosperous fathers paying more to match their sons with the most prestigious and profitable occupation within a London company.

Premiums and the freedom

If the payment of premiums led to higher quality training, we might expect this to be reflected in outcomes for apprentices at the end of the indenture period. One outcome that we can observe, at least for part of our sample, is whether the apprentice was formally freed from the indenture at the end of the term. For most citizens of London, obtaining the freedom through apprenticeship was the first step in becoming an independent tradesman working on their own account, and larger payments to the master would be worthwhile if it made freedom more likely at the end.

Table 5 summarises linear probability regressions of the determinants of freedom for the four companies (blacksmiths, plasterers, stationers, turners) for which we know whether the apprentice was ultimately freed.¹⁵ The explanatory variables include log premiums, and the full range of apprentice characteristics used in earlier regressions. Column 1 shows that while several characteristics are correlated with freedom. The apprentices whose fathers were no longer alive were less likely to achieve the freedom. Freedom was most interesting for those who had the capital and connections to start their own business, and those without access to a father's income may have seen this possibility as less attractive. Kin apprentices were also significantly less likely to be freed, which may reflect the expectation that they would enter their father's firm after completing their training period. Father occupation appears to have little systematic effect on freedom outcomes. Premiums, however, do have a small, but significant effect.¹⁶ 26 percent of apprentices in the four companies were freed in London; multiply the coefficient on log premium by the standard deviation of log premium (1.64) suggests that a one standard deviation increase in premium size would raise the freedom rate by about 9 percent. Is this effect large enough to make paying larger premiums worthwhile? To answer this, we would want to work out the increase in the net present value of lifetime income associated with a given change in premium size. We do not have reliable estimates of the difference between the earnings of a journeyman and that of a successful member of a London company. We can, however, estimate the lower bound on how large this would have to be to make paying more for freedom worthwhile. Suppose that paying an extra £50 raises the probability of being freed by 2.5 percentage points, which is more or less in line with our econometric findings. If the prospective apprentice expects to work for 25 years post-indenture, an interest rate of 4.5 percent (the average rate of return between 1710 and 1750, as calculated from Clark 1998) would imply that the earnings premium associated with receipt of

¹⁵ Probit regression yield similar marginal effects.

¹⁶ As in earlier work, this is measured as $\ln(\text{premium} + £1)$. We have also estimated this regression with a positive premium indicator in place of the continuous measure. This alternative is also significant at the 5 percent level.

the freedom would have to be in the order of 130 pounds per annum. This is large relative to estimated differences in per capita income one might draw from mid 18th century social tables (Lindert and Williamson 1982). This tentative calculation suggests that premiums were positively associated with freedoms, but that apprentices could not necessarily expect to recover this up-front payment through future earnings.

Conclusions

This paper is part of a wider project seeking to re-examine the institution of apprenticeship in premodern England. Our project aims to uncover the microeconomic practices of premodern apprenticeship and through this identify the ways in which it facilitated and constrained human capital formation in the centuries leading up to industrialisation. In the current piece, we present the results of a pilot study examining apprenticeship premiums in 18th century England. The objective of the piece is to quantify premiums over this period. How frequent and how large were apprenticeship premiums? What were the determinants of premiums, and what were some of the effects of premiums on outcomes?

As noted above, this is a pilot study: we will have a much larger data base of premium and apprenticeship records to draw from by the end of the summer. As one would expect with a relatively small sample, we cannot draw clear-cut solution relating to all the hypotheses we have tested, and there are more to explore in future work. We can, however, reject one common assumption of the secondary literature: that premiums were nearly universal in eighteenth century apprenticeship in England. We find that a considerable proportion of apprentices entered training with no fee being paid, particularly in low status and low income trades. Moreover, compared to the sums required to establish businesses in these sectors premiums and fees were a relatively minor impediment. This suggests that high fees from masters were not setting high bars to entry that could serve to preserve skilled urban trades and citizenship for those with substantial resources or appropriate connections.

Our regression results suggest that premiums varied with the place origins of the youths trained. Some of our findings indicate that premiums were lower for youths from London or nearby areas, and (in some trades) for those whose parents' were citizens. For kin and children of masters within the same company premiums were almost never charged. This was a training market that was biased against, if not closed to, outsiders. We find strong evidence that premiums varied according to the social origin of apprentices. Even when entering the same occupation, apprentices from relatively wealthy backgrounds

– such as those whose fathers were described as gentry – paid substantially more than those who came from more modest craft and trading families. Where we have evidence on occupations within companies, it appears that part of the relationship between father status and premium size reflects placement with masters in more prestigious and profitable occupations within companies. Premiums had only a modest impact on freedom rates, suggesting that the ability to pay larger fees up-front had little impact on the long-term value of their training. However, higher premiums may well be connected to different experiences of apprenticeship in the short term. Larger premiums may have allowed youths from wealthy backgrounds to enjoy greater consumption over their period of indenture. Whether higher premiums for children of the wealthy are also a case of pricing according to ability to pay – with masters obtaining rents in these cases – is hard to say.

References

- I.K. Ben-Amos (1994) *Adolescence and Youth in Early Modern England*. New Haven.
- M. Berlin (2008) "Guilds in Decline? London Livery Companies and the Rise of a Liberal Economy, 1600-1800", in S. R. Epstein and M. Prak eds., *Guilds, Innovation, and the European Economy, 1400-1800*. Cambridge, pp. 316-342.
- Brooks, C. W. (1994) "Apprenticeship, Social Mobility and the Middling Sort, 1550-1800", in J. Barry and C. W. Brooks eds., *The Middling Sort of People: Culture, Society and Politics in England, 1550-1800*, Basingstoke, pp. 52-83.
- G. Clark (1998) "The Charity Commissioners as a source in English economic history." *Research in Economic History* 18 pp. 1-52.
- T.G. Conley and D.G. Galenson (1994) "Quantile regression analysis of censored wealth data." *Historical Methods* 27(4) pp. 149-165
- D. Defoe (1725) *The Complete English Tradesman*. London.
- B. de Munck (2007) *Technologies of Learning: Apprenticeship in Antwerp Guilds from the 15th Century to the end of the Ancien Regime*. Turnhout.
- O.J. Dunlop and R.D. Denham (1912) *English Apprenticeship and Child Labour*. London.
- P. Earle (1989) *The Making of the English Middle Class*. London.
- S.R. Epstein (1998) "'Craft Guilds, Apprenticeship, and Technological Change in Preindustrial Europe.'" *Journal of Economic History* 58(3), pp. 684-713.
- R. Grassby (1995) *The Business Community of Seventeenth-Century England*. Cambridge.

G. Hamilton (1995) "Enforcement in apprenticeship contracts: were runaways a serious problem? Evidence from Montreal." *Journal of Economic History* 55(3), pp. 551-574.

J. Humphries (2003) "English apprenticeship: a neglected factor in the first Industrial Revolution." In P.A. David and M. Thomas eds., *The Economic Future in Historical Perspective*. Oxford, pp. 73-102.

S.L. Kaplan (1993) "L'Apprentissage au XVIIIe Siecle: Le Cas De Paris." *Revue d'histoire moderne et contemporaine* 40(3), pp. 436-479.

J. Lane (1996) *Apprenticeship in England, 1600-1914*. London.

T. Leunig, C. Minns, and P.H. Wallis (2008) "How fluid were labour markets in pre-industrial Britain? Evidence from apprenticeship records." Paper presented at Edinburgh World Cliometrics Congress.

P.H. Lindert and J.G. Williamson (1981) "Revising England's social tables, 1688-1812." *Explorations in Economic History* 19(4) pp. 385-408.

C. Minns and P.H. Wallis (2009) "Rules and reality: quantifying the practice of apprenticeship in early modern England." LSE Economic History Working Paper 118.

S. Ogilvie (2004) "Guilds, efficiency, and social capital: evidence from German proto-industry." *Economic History Review*, 57(2), pp. 286-333.

S. Ogilvie (1997) *State Corporatism and Proto-Industry: the Wuerttemberg Black Forest, 1580-1797*. Cambridge.

R. Reith (2007) "Apprentices in the German and Austrian Crafts in Early Modern Times: Apprentices as Wage Earners?" in B. De Munck, S. L. Kaplan and H. Soly eds., *Learning on the Shop Floor: Historical Perspectives on Apprenticeship*. New York, pp. 179-203.

L. D. Schwarz (1992) *London in the Age of Industrialisation: Entrepreneurs, Labour Force and Living Conditions, 1700-1850*. Cambridge.

J.L. Van Zanden (2009) "The skill premium and the 'Great Divergence'" *European Review of Economic History*, 13(1), pp. 121-153.

Table 1: training premiums, by company

	% paying premium	average	sd	median	P10	P90	N
Apothecaries	84	73	36	63	40	105	589
Blacksmiths	20	10	10	6	4	20	2105
Grocers	59	84	80	30	8	200	380
Plasterers	31	8	4	5	4	13	400
Stationers	100	32	44	15	5	92	330
Turners	54	12	12	10	4	21	401
Vintners	32	16	22	10	5	21	823
All companies	43	36	46	15	5	100	5028

Notes: N is the total number of observations, not the number of observations for which we have premiums.

Table 2: training premiums, by occupation

	% paying premium	average	sd	median	P10	P90	N	Insured wealth (med.)
Bookbinder	100	9	5	6	5	20	58	
Bookseller	100	74	56	63	5	150	42	800
Druggist	73	175	46	200	105	210	15	
Grocer	78	119	78	100	50	200	32	500
Haberdasher	95	67	71	40	5	150	20	500
Instrument maker	94	9	7	6.3	3	20	31	
Plasterer	42	7	4	6	4	13	85	
Printer	100	20	17	20	5	40	107	400
Stationer	100	56	60	37	5	105	46	500

Notes: N is the total number of observations, not the number of observations for which we have premiums. Median insured wealth is from Schwarz (1992).

Table 3: The determinants of training premiums, 1710-1750

	Premium paid	Premium size	
	(1)	(2)	(3)
	LPM	OLS	Tobit (mfx)
London apprentice	-.023 (.016)	-.243*** (.046)	-.124*** (.036)
Neighbouring county apprentice	-.012 (.017)	-.075 (.051)	-.041 (.039)
Father citizen	-.115*** (.021)	-.325** (.062)	0.257*** (.044)
Father deceased	.026* (.014)	.028 (.070)	.047 (.033)
Kin apprentice	-.394*** (.069)	-.836*** (.199)	-.846*** (.117)
Gentleman father	.268*** (.035)	1.09*** (.101)	.925*** (.134)
Husbandman father	-.074* (.011)	-.171 (.121)	-.171* (.090)
Yeoman father	.011 (.043)	.109 (.126)	.061 (.101)
Other agriculture father	.113** (.041)	.272** (.120)	.344*** (.124)
Craft father	.069** (.029)	.227*** (0.83)	.225*** (.079)
Distribution/Sales father	.162*** (.034)	.620*** (.100)	.595*** (.118)
Service father	.105*** (.033)	.327*** (.096)	.355*** (.104)
Professional father	.213*** (.036)	.814*** (.104)	.723*** (.128)
Company dummies	Y	Y	Y
Year dummies	Y	Y	Y
Constant	.592*** (.067)	2.62*** (.193)	
R-square	.35	.50	
Pseudo R-square			.17
N	4773	4773	4773

Notes: Log premium is equal to $\ln(\text{Premium} + \text{£}1)$, as described in the text. Standard errors in parentheses. ***, **, and * indicate coefficients significant at the 1%, 5%, and 10% level. Father labourer is the excluded parent occupation group.

Table 4: Determinants of premium size, across companies

	Apothecaries	Blacksmiths	Grocers	Plasterers	Stationers	Turners	Vintners
London apprentice	-.182 (.158)	-.020 (.053)	-.068 (.274)	-.112 (.137)	-.840*** (.134)	-.093 (.213)	-.280** (.128)
Neighbouring county apprentice	-.010 (.158)	.018 (.060)	.683** (.345)	-.019 (.165)	-.287* (.153)	.213 (.219)	-.387*** (.131)
Father citizen	-2.51*** (.277)	-.202** (.079)	-.398 (.341)	-.007* (.150)	-.605** (.237)	.204 (.186)	.096 (.172)
Father deceased	---	.024 (.042)	.010 (.268)	.128 (.108)	-.148* (.089)	.062 (.136)	.247 (.118)
Kin	---	---	---	---	---	---	-1.06 (.397)
Gentleman father	3.87*** (1.03)	1.16*** (.138)	2.17 (1.41)	.436 (.687)	1.16*** (.384)	.970** (.402)	1.27*** (.375)
Husbandman father	-.919 (1.02)	-.181 (.121)	.185 (1.28)	-.480 (.313)	-.318 (.468)	1.37* (.768)	-.641* (.361)
Yeoman father	-.272* (.706)	.079 (.180)	.894 (.769)	-.064 (.297)	.087 (.327)	.748* (.444)	-.275 (.295)
Other agriculture father	3.59*** (1.18)	.305** (.123)	-.009 (1.52)	.286 (.264)	.466 (.438)	-.245 (.491)	.842** (.429)
Craft father	3.52*** (1.03)	.144* (.079)	1.03 (1.41)	-.055 (.164)	.335 (.360)	.028 (.337)	.508 (.364)
Distribution/Sales father	3.95*** (1.04)	.510*** (.121)	.820 (1.42)	-.007 (.265)	1.00*** (.372)	.513 (.394)	.858** (.380)
Service father	3.82*** (1.09)	.180* (.094)	1.15 (1.42)	-.003 (.223)	.515 (.361)	.399 (.390)	.773** (.394)
Professional father	3.78*** (1.03)	.850*** (.143)	1.99 (1.42)	.710* (.416)	.775** (.378)	1.13 (.579)	1.57*** (.393)
Constant	0.05 (1.02)	.242*** (.083)	.930 (1.39)	.624*** (.182)	2.95*** (.376)	1.06*** (.368)	.518 (.362)
R-square	.22	.06	.13	.04	.30	.16	.13
N	549	2017	342	385	380	358	742

Notes: Log premium is equal to $\ln(\text{Premium} + \text{£}1)$, as described in the text. Standard errors in parentheses. ***, **, and * indicate coefficients significant at the 1%, 5%, and 10% level. Father labourer is the excluded parent occupation group.

Table 5: The determinants of premium size, including master characteristics

	With master characteristics		With master occupation	
	Premium size		Premium size	
	(1)	(2)	(3)	(4)
	OLS	OLS	OLS	OLS
London apprentice	-.128 (.105)	-.128 (.106)	-.490*** (.159)	-.281* (.154)
Neighbouring county apprentice	-.005 (.115)	-.006 (.116)	-.164 (.187)	-.055 (.177)
Father citizen	-.500*** (.151)	-.502*** (.153)	-.215 (.249)	-.171 (.234)
Father deceased	.199** (.095)	.196** (.095)	.053 (.126)	.095 (.119)
Kin apprentice	-.826** (.466)	-.828* (.468)	---	---
Gentleman father	.992*** (.269)	.973*** (.272)	1.24*** (.419)	.808** (.403)
Husbandman father	.003 (.302)	.034 (.303)	-.551 (.604)	-.484 (.570)
Yeoman father	.026 (.323)	.059 (.325)	.464 (.399)	.396 (.377)
Other agriculture father	.002 (.326)	-.026 (.329)	.428 (.479)	.095 (.460)
Craft father	.158 (.235)	.150 (.237)	.311 (.376)	.049 (.360)
Distribution/Sales father	.529** (.269)	.507* (.272)	.722* (.418)	.343 (.400)
Service father	.187 (.266)	.171 (.268)	.288 (.411)	-.055 (.393)
Professional father	.635** (.272)	.608** (.274)	1.00** (.414)	.549 (.397)
Same place of origin as master		-.037 (.189)		
Same county of origin as master		-.109 (.115)		
Master takes 2-5 apps		-.007 (.126)		
Master takes 6-10 apps		.030 (.138)		
Master takes 11-20 apps		.124 (.175)		
Master takes over 20 apps		.500 (.533)		

Table 5, continued

	With master characteristics		With master occupation	
	Premium size			
	(1)	(2)	(3)	(4)
	OLS	OLS	OLS	OLS
Bookbinder				-.306 (-.253)
Bookseller				1.15*** (.276)
Druggist				1.23*** (.405)
Grocer				1.38*** (.276)
Haberdasher				.766** (.340)
Instrument maker				-.075 (.287)
Plasterer				-.339 (.289)
Printer				.211 (.225)
stationer				.779*** (.272)
Company dummies	Y	Y	Y	Y
Year dummies	Y	Y	Y	Y
Constant	4.42*** (.773)	4.38*** (.786)	.431 (1.01)	.910 (.992)
R-square	.55	.55	.43	.51
N	1012	1012	499	499

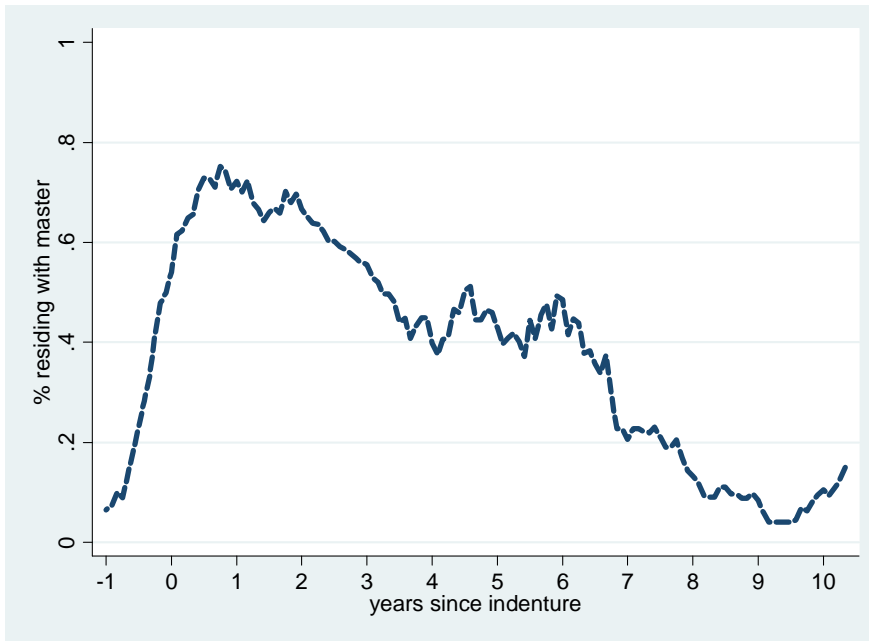
Notes: Log premium is equal to $\ln(\text{Premium} + \text{£}1)$, as described in the text. Standard errors in parentheses. ***, **, and * indicate coefficients significant at the 1%, 5%, and 10% level. Father labourer is the excluded parent occupation group. All other occupations are the excluded master occupation group.

Table 6: Freedom and premiums

	Apprentice freed
	LPM
London apprentice	-.017 (.020)
Neighbouring county apprentice	.005 (.023)
Father citizen	.027 (.027)
Father deceased	-.052*** (.016)
Kin apprentice	-.180** (.085)
Gentleman father	.018 (.049)
Husbandman father	-.098** (.048)
Yeoman father	-.011 (.055)
Other agriculture father	.057 (.047)
Craft father	.014 (.030)
Distribution/Sales father	.054 (.043)
Service father	-.004 (.036)
Professional father	-.002 (.054)
Log premium	.014* (.008)
Company dummies	Y
Year dummies	Y
Constant	.289*** (.110)
R-square	.17
N	3028

Notes: Log premium is equal to $\ln(\text{Premium} + \text{£}1)$, as described in the text. Standard errors in parentheses. ***, **, and * indicate coefficients significant at the 1%, 5%, and 10% level. Father labourer is the excluded parent occupation group.

Figure 1: Proportion of London apprentices resident with their master, 1685-1696



Notes: From Minns and Wallis (2009).

Figure 2: proportion of premium returned when apprenticeship ended early

